

**IN THE UNITED STATES PATENT & TRADEMARK OFFICE**

IN RE APPLICATION OF :  
YASUHIRO IWAMURA, ET AL. : EXAMINER: KEITH, JACK W  
SERIAL NO: 09/981,983 :  
FILED: OCTOBER 19, 2001 : GROUP ART UNIT: 3641  
FOR: NUCLIDE TRANSMUTATION :  
DEVICE AND NUCLIDE  
TRANSMUTATION METHOD

**REQUEST FOR SUSPENSION UNDER C.F.R. §1.103(a) or (c)**

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

Applicants herein request a six month suspension of prosecution under 37 C.F.R. § 1.103(a) or alternatively a three month suspension under 37 C.F.R. § 1.103(c).

In the Office Action dated July 7, 2004, Claims 1, 4-6 and 10-16 of the present application were rejected under 35 U.S.C. §101, as containing subject matter rendered inoperative and lacking utility, and under 35 U.S.C. §112, first paragraph, as containing subject matter lacking adequate written description and not enabling to one skilled in the relevant art. The Office Action stated that “[i]f reproducibility only occurs in one’s own lab, errors (such as systematic errors) would be suspect” and required that “reproducibility must go beyond one’s own lab.” A cooperative experiment is currently being conducted by an Independent Administrative Institution, RIKEN, as evidenced by the attached schedule (Appendix A, “Proposal No. 2004B0456-NXb-np”) and proposal (Appendix B), and it is believed that its experiments will provide results supportive of the operability of the present

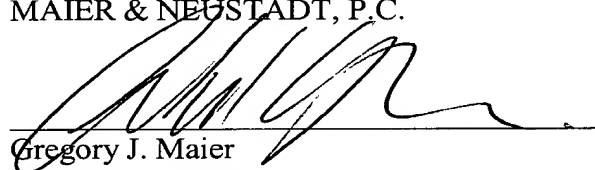
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invention. Therefore, Applicants respectfully submit that there are good and sufficient reasons for the requested suspension and that the requirements for 37 C.F.R. § 1.103(a) are met.

If, however, the RIKEN experiment does not comprise “good and sufficient reasons” as required under 37 C.F.R. § 1.103(a), Applicants alternatively request a three month suspension under 37 C.F.R. § 1.103(c), as the processing fee required under §1.17(i) is attached herewith. The Commissioner is also authorized to withdraw any fee insufficient from the undersigned attorney’s account no. 15-0030.

Respectfully submitted,

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# Appendix A

## General Research Proposals 2004B (5/9)

S/N #1-#50 #51-#100 #101-#150 #151-#200 #201-#250 #251-#300 #301-#350 #351-#400 #401-#418

CONTACT: SPring-8 Users Office; [sp8jasri@spring8.or.jp](mailto:sp8jasri@spring8.or.jp)

S/N	Proposal No.	Title of Experiment	Project Leader	Affiliation	Country	Beamline	Shifts
201	2004B0426-NL3-np	Phase X-ray micro-CT imaging in various disease models	Tohoru Takeda	University of Tsukuba	Japan	BL20XU	6
202	2004B0427-NL1-np	Structure determination of sodium-translocating ATPase in <i>Enterococcus hirac</i>	Ichiro Yamato	Tokyo University of Science	Japan	BL38B1	3
203	2004B0428-NSb-np	Resonance Formation and Decay processes of Hot Molecules by Soft X-ray Inner Shell Excitation	Hiroshi Tanaka	Sophia University	Japan	BL27SU	18
204	2004B0429-ND2b-np	Phase transitions and density changes in pyrolite to 50 GPa and implications for the seismic discontinuities in the lower mantle	Tetsuo Irifune	Ehime University	Japan	BL04B1	12
205	2004B0431-ND2b-np	Precise determination of elastic wave velocities by a combination of ultrasonic and X-ray diffraction measurements under high pressure and high temperature	Tetsuo Irifune	Ehime University	Japan	BL04B1	15
206	2004B0433-ND2b-np	Generation of pressures to 60 GPa using sintered diamond anvils	Daisuke Yamazaki	Ehime University	Japan	BL04B1	9
207	2004B0437-ND2b-np	Precise phase relations in the MgO-FeO-SiO <sub>2</sub> system under lower mantle conditions Part-2	Eiichi Takahashi	Tokyo Institute of Technology	Japan	BL04B1	12
208	2004B0441-NI-np	Precise structure analysis of complex hydrides of light elements	Shin-ichi Towata	Toyota Central R&D Laboratories, Inc.	Japan	BL19B2	6
209	2004B0442-NI-np	Microdiffraction analyses of cell membrane complex (CMC) structure in human hair samples : Relationship with effects of hair-dressing chemicals on hair fiber	Takafumi Inoue	Kanebo Cosmetics Inc.	Japan	BL40XU	12
210	2004B0443-NL1-np	High-resolution structural studies on the batho-lumi transition in rhodopsin	Tetsuji Okada	National Institute of Advanced Industrial Science and Technology	Japan	BL38B1	3
211	2004B0444-NL1-np	X-ray crystallographic studies on the protein dynamics during the activation of rhodopsin	Tetsuji Okada	National Institute of Advanced Industrial Science and Technology	Japan	BL38B1	3
212	2004B0446-NL1-np	Structure analysis of cold-adapted arabinanase ABN-C	Toshiji Tada	Osaka Prefecture University	Japan	BL38B1	1
213	2004B0447-NL1-np	Structure analysis of Dog allergen Can f1	Toshiji Tada	Osaka Prefecture University	Japan	BL38B1	1
214	2004B0448-NL1-np	Structure analysis of Dog allergen Can f2	Toshiji Tada	Osaka Prefecture University	Japan	BL38B1	1
215	2004B0450-NL1-np	Structural analysis of RC-LH1 crystal	Takashi Kumasaka	Tokyo Institute of Technology	Japan	BL41XU	6
		Vibration Modes in Halogen-Etching Process					

216	2004B0454- NSa-np	of Silicon Surface Observed by Means of Infrared Transmission Absorption Spectroscopy (I)	Masatoshi Tanaka	Yokohama National University	Japan	BL43IR	6
217	2004B0456- NXb-np	In-situ Elemental Analysis on Pd Complexes during D2 Gas Permeation with X-ray Fluorescence Spectrometry	Yasuhiro Iwamura	Mitsubishi Heavy Industries, Ltd.	Japan	BL37XU	18
218	2004B0457- NI-np	Visualization of Microstructures for Improving Impact Energy Absorbing Capacity in Advanced Porous Aluminum Materials	Hiroyuki Toda	Toyohashi University of Technology	Japan	BL47XU	12
219	2004B0460- ND2a-np	Pressure-induced structural changes in liquid CuI and liquid CuBr	Kazuhiko Tsuji	Keio University	Japan	BL22XU	15
220	2004B0461- ND2a-np	Structure of liquid ZnSe, ZnTe and liquid CuI under high pressure	Kazuhiko Tsuji	Keio University	Japan	BL04B1	12
221	2004B0464- ND1a-np	Observation of the lattice distortion in a heavy-fermion antiferromagnet $\text{Ce}_7\text{Ni}_3$ with geometrical frustration	Kazunori Umco	Hiroshima University	Japan	BL02B1	3
222	2004B0465- NL2a-np	Structural phase transitions of monolipid lipid cubic phase induced by inclusion of protein lysozyme molecules	Shinpei Tanaka	Hiroshima University	Japan	BL40B2	3
223	2004B0466- NXa-np	In Situ Structural Analysis of Noble Metal Catalysis Suspended in Solvent under the Oxidation-Reduction Conditions by Means of Quick XAFS	Tsutomu Fujita	Mitsubishi Rayon Co., Ltd.	Japan	BL01B1	9
224	2004B0467- NL3-np	Development of Medical Treatment Diagnosis System by means of X-ray Dark-Field Imaging	Masami Ando	High Energy Accelerator Research Organization	Japan	BL20B2	6
225	2004B0468- NSa-np	Search of Pressure-induced metal-insulator transition of Pyrochlore-type Molybdate oxides by means of Infrared microscope at low-temperature and high-pressure	Atsushi Higashiya	RIKEN	Japan	BL43IR	8.75
226	2004B0469- ND3d-np	Search of two-dimensional high-Tc superconductor $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$ by means of Resonant Inelastic X-ray Scattering (RIXS)	Atsushi Higashiya	RIKEN	Japan	BL19LXU	21
227	2004B0470- ND2a-np	Transition of Local Structure in High-Pressure Super-Critical state of Oxygen	Yuichi Akahama	University of Hyogo	Japan	BL04B2	12
228	2004B0472- ND2a-np	Structural Study on Phase Transition of Scandium up to 300 GPa	Yuichi Akahama	University of Hyogo	Japan	BL10XU	6
229	2004B0473- NL2a-np	Research and development for microdiffraction mapping of rapidly frozen biological specimens using the high-flux beamline BL40XU	Hiroyuki Iwamoto	Japan Synchrotron Radiation Research Institute	Japan	BL40XU	9
230	2004B0474- NL2a-np	X-Ray diffraction from a limited volume of frozen biological specimens	Hiroyuki Iwamoto	Japan Synchrotron Radiation Research Institute	Japan	BL45XU	6
231	2004B0475- NL2a-np	Ultrahigh-speed time-resolved X-ray diffraction study of the effect of contractile protein-specific small-molecule compounds on the structure of regulatory proteins	Hiroyuki Iwamoto	Japan Synchrotron Radiation Research Institute	Japan	BL40XU	18
		Electron density distribution near the					

232	2004B0476-ND1a-np	transition temperature in superconducting yttrium carbide system synthesized under high pressure	Keiichi Osaka	JASRI	Japan	BL02B2	4
233	2004B0477-NM-np	X-ray holographic imaging with Fresnel zone plate objective and prism interferometer	Yoshio Suzuki	Japan Synchrotron Radiation Research Institute	Japan	BL20XU	30
234	2004B0478-NL3-np	In Vivo Imaging with Maximum-Density-Resolution using Low-Energy X-rays	Keiji Umetani	Japan Synchrotron Radiation Research Institute	Japan	BL28B2	12
235	2004B0479-NL3-np	Large-Field and High-Resolution Imaging using 4M-Pixel Real-Time Image Detector	Keiji Umetani	Japan Synchrotron Radiation Research Institute	Japan	BL28B2	9
236	2004B0480-NL3-np	Development of High-Resolution-Type Micro-Tomosynthesis System	Keiji Umetani	Japan Synchrotron Radiation Research Institute	Japan	BL20B2	6
237	2004B0481-NL3-np	In Vivo Large-Field Imaging using Low-Energy X-rays in High-Flux Mode of BL20B2	Keiji Umetani	Japan Synchrotron Radiation Research Institute	Japan	BL20B2	10
238	2004B0483-NSc-np	The photo-induced phase transition in $\text{RbMnFe}(\text{CN})_6$ observed with XMCD	Hitoshi Osawa	The University of Tokyo	Japan	BL39XU	12
239	2004B0485-NL2a-np	Structural Changes in $\alpha$ -Crystallin during Lens Development : Protein Folding and Chaperone Activity	Satoshi Mohri	Okayama University	Japan	BL40B2	3
240	2004B0486-NSa-np	Noise reduction at BL43IR, Test version of the active feedback system	Taro Moriwaki	Japan Synchrotron Radiation Research Institute	Japan	BL43IR	18
241	2004B0489-NSb-np	The investigation of K-edge threshold by using the neutral high-Rydberg states	Tatsuo Gejo	University of Hyogo	Japan	BL27SU	9
242	2004B0490-NI-np	Structural Analysis of Passive Film on Iron Surface by Grazing Incidence X-Ray Scattering Method II	Masato Yamashita	University of Hyogo	Japan	BL46XU	9
243	2004B0491-ND3d-np	Searching of phonon softening mode in one-dimensional system $\text{BaVS}_3$	Yoshikazu Tanaka	RIKEN	Japan	BL35XU	15
244	2004B0492-NM-np	Development of Kirkpatrick-Baez type focusing mirror for high energy x-ray region	Akihisa Takeuchi	Japan Synchrotron Radiation Research Institute	Japan	BL20XU	18
245	2004B0494-NSa-np	Observation of an atomic displacement induced by a core exciton excitation in light-element compounds : Polarization dependence in soft x-ray recombination emission	Yoshihisa Harada	RIKEN	Japan	BL27SU	9
246	2004B0495-NSc-np	High-precision soft X-ray MCD measurement using 10Hz helicity switching and an electromagnet	Takayuki Muro	Japan Synchrotron Radiation Research Institute	Japan	BL25SU	6
247	2004B0497-ND2b-np	Determination of phase relations of the postspinel transition in $(\text{Mg}_{0.9}\text{Fe}_{0.1})_2\text{SiO}_4$ using catalysts	Tomoo Katsura	Okayama University	Japan	BL04B1	9
248	2004B0498-ND2b-np	Measurement of thermal expansion of $\text{MgSiO}_3$ perovskite at the top of the lower mantle	Tomoo Katsura	Okayama University	Japan	BL04B1	15
		Phase measurement using interferometric					

249	2004B0504-NM-np	microscope with an X-ray prism and imaging optics	Yoshiki Kohmura	RIKEN	Japan	BL20XU	12
250	2004B0509-NM-np	Development of high-spatial resolving 3-D x-ray phase CT by using high-speed scanning microscope system	Hidekazu Takano	University of Hyogo	Japan	BL20XU	18

2004B0456-NXb-np

BL37XU

## In-situ Elemental Analysis on Pd Complexes during D<sub>2</sub> Gas Permeation with X-ray Fluorescence Spectrometry

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<sup>1</sup>Advanced Technology Research Center, Mitsubishi Heavy Industries, Ltd., <sup>2</sup>Element Spectroanalysis Team, JASRI, <sup>3</sup>Coherent X-ray Optics Laboratory, RIKEN,

Elemental changes of Cs into Pr induced by D<sub>2</sub> gas permeation through Pd complexes were reported. In order to demonstrate the reported phenomena and make clear the nature of the transmutation of Cs into Pr, the authors built up an experimental set-up aiming in-situ measurement as shown in Fig.1.

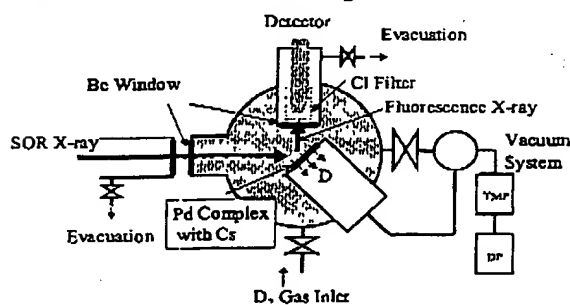


Fig.1 Experimental Set-up

The Pd complex consists of Pd bulk (25mmX25mmX0.1mm), Pd and CaO complex layer(100nm) and Pd thin film(40nm). Cs was deposited by the ion beam implantation method(5kV,  $2.5\text{--}5 \times 10^{14} / \text{cm}^2$ ). We made D<sub>2</sub> gas permeated through a Pd complex with Cs for 10-14 days. D<sub>2</sub> gas pressure is about 170kPa and the temperature was 70°C. X-ray fluorescence spectrometry (XRF) was

performed during D<sub>2</sub> permeation in-situ at the beginning and the end of experiments.

Three foreground experiments resulted in detection of Pr and a background experiment without CaO layer gave no Pr. Fig.2 shows an example of obtained spectra. Surface distribution of XRF spectra were obtained using 1mm square X-ray beam. Clear Pr spectrum can be seen at the point shown in Fig.2. Pr spectra were obtained at some points, however, no Pr at the other points; it indicates that there exists Pr surface distribution.

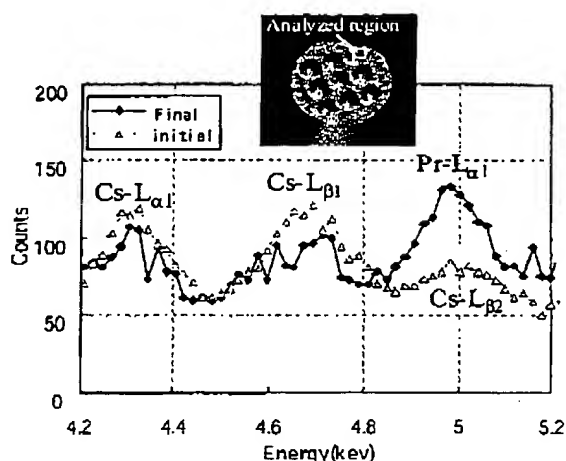


Fig.2 Detection of Pr by XRF